"Started from Christiania at about 2 a.m. in the *Nyland* steamer bound for Christiansand. At Krujero the steamer forced its way through the ice for half an hour till within about a mile of the land, where sleighs met it on the ice. The passengers and cargo were discharged or taken up on the ice, out of which we backed in close proximity to the *Kong Hacon*, which steamer had followed us in. A beautiful sunset and Arctic winter view, clear air, and rich sky, also a distant ship fast in the ice. The *Nyland* stopped at Arendal for the night, having got to the quay through much ice. We observe often phosphorescence or phosphorescence-like sparks and flashes in the ice as it is broken up by the steamer."

I think that the average thickness of the ice might have been about eight inches. I cannot give the temperature, but on the previous day at Christiania the thermometer indicated about 8° or 10° below zero Fahrenheit (about 40° Fahrenheit of frost). The diary from which the above extract is taken was kept jointly by myself and my travelling-companion, Mr. Winter, of the Indian Civil Service, who of course also saw the flashes referred to. I should like to have been able to talk the matter over again with him, but he is now in India. J. ALLEN ALLEN

[The question raised in this letter is a very interesting one. The phenomenon is possibly analogous to the electric flashes which are produced when loaf-sugar is crushed or when mica is rapidly split. It appears very improbable that it can be due to phosphorescent creatures in the water under the ice.—ED.]

## Tidal Currents *versus* Wind Waves

IN NATURE, vol. xxiv. p. 286, a writer on "sea-shore alluvion" positively asserts that the travelling of sea beaches is due to wind-waves, and not to tidal currents, and calls a writer in the *Engineer* to task for having stated the latter. Notwithstanding this assertion, I would suggest that the writer in the *Engineer* is right. Twenty-five years ago, when an engineering student, I was taught that sea-beach travelling was due to wind-waves. Afterwards, while knocking about during fifteen years in the vicinity of the south and west coasts of Ireland, I noted facts that went to show that such a theory was not universally correct. This led me to study wind-action on the sea and lakes, also all I could find that had been written on the subject; the result being that as *good* evidence was so contradictory, no opinion could be come to from the evidence of others. But it was not till about ten years ago, when I was so circumstanced that I could properly study wave-action, and after six years' careful observation on the south-east coast of Ireland, that I found that tidal currents were the principal motive power; and on again reading what had been written on the subject, that I found that nearly all the advocates for the driftage of sea beaches by wind-waves had studied on beaches *where the most continuous and powerful winds acted in conjunction with the flow-tide current.* As the results of my observations have been published in the *Proceedings* of the Royal Irish Academy, English and Irish Institutions of Civil Engineers, the Geological Societies of London, Dublin, &c., during the last six or eight years, it is unnecessary to repeat them here. I would, however, point out that when there are only wind-waves and no tidal currents, the beaches as a general rule are banked up, but do not travel (the writer in NATURE seems to have observed this, but does not appear to see the importance of it). This may be seen in the tideless Mediterranean, as pointed out by the late Dr. Ansted in his paper on the Lagoons at the Delta of the Rhone; it may also be seen in Malcombe, or any other bay where there is a "head of the tide" but no tidal current; and in the different freshwater lakes, when the wind-waves are the *only* motive power. But wherever there are tidal currents acting on a coast the beach must travel. Such tidal currents are those that most perplex the erectors of groynes. If there was only the travelling augmented by wind-waves, the erection of groynes would be very simple; but, as a general rule, they are most necessary where there are strong tidal currents (or conflicting currents) due to the regular "flow" tide, "half counter" tides, or "on-shore" tides; which conflicting currents, combined with the action of wind-waves, let them be direct or as "ground swells," make up all the "cutting-out tides." The greater the complications the greater the "cutting out," and the more ingenious have to be the groynes. "Fulls" accumulate with the wind-waves, but rapidly disappear when the wind ceases. I presume the writer of the article in question is aware that the greatest rise of tide and the least current is at the "heads of the tides," while the least rise and greatest current is at the "nodal or hinge lines"; and I would be interested to know where permanent beaches accumulate in the latter localities, as from what I have seen those that form rapidly disappear when the wind ceases. G. H. KINAHAN

H.M. Geological Survey

## Glaciation

IN NATURE, vol. xxiv. p. 364, I see a notice of a paper by Dr. Woeikoff on the glacial climate, in which it is shown that "the difference of mean temperature at the lower ends of glaciers (in different parts of the world) reaches fully 20°." This might be expected. The extent of glaciation depends not at all on mean or on winter temperature, but chiefly on summer temperature. *Perpetual* snow means *summer* snow, so that summer temperature is what determines the extent of the snow-fields remaining unmelted in the summer, and consequently of the glaciers which are fed by the snow-fields. The extent of glaciation is also much influenced by the amount of snow-fall. All this is stated in Forbes's "Norway and its Glaciers."

JOSEPH JOHN MURPHY

Old Forge, Dunmurry, Co. Antrim

## Yellow Glass in Fog

SOME years ago I was staying at an hotel on the Lake of Constance. One morning a fog came on which completely obscured the opposite shore, but looking through a strip of yellow glass, which formed the border of the window, I was able, to my surprise, to see it distinctly. I presume the yellow glass choked the blue rays reflected by the fog, just as a Nicol's prism, held at the proper angle, chokes the rays reflected from the glass and enables us to see clearly the picture behind it. On my way home I stopped in Paris, and, happening to call on one of the principal opticians, mentioned the circumstance to him. He forthwith showed me a naval telescope provided with a cap at the eye end containing a yellow glass, which could be removed at pleasure. I should like to know if the same simple contrivance has ever been used in our own navy. R.

## The New Museum of Natural History

IN your article on "The New Museum of Natural History" (NATURE, vol. xxiii. p. 549 *et seq.*) it is stated that the specimen of *Archæopteryx macrura* in the British Museum is headless. Will you permit me to draw attention to a nodule projecting from the slab in which the fossil lies, which bears a striking resemblance to the cerebral portion of a bird's skull? It is some years since I visited the museum, but I recollect feeling satisfied at the time that the nodule was the missing head, and worth while disinterring from its surrounding slate. E. H. PRINGLE

Calicut, July 31

[The nodule referred to by our correspondent is well known, and has been frequently criticised. Mr. John Evans, D.C.L., F.R.S., drew attention to it in an article published by him in the *Natural History Review*, 1865, pp. 415-421: "On portions of a cranium and of a jaw in the slab containing the fossil remains of the *Archæopteryx*." Although these fragments which occur in the slab in question undoubtedly belong to *Archæopteryx*, yet, as stated in our article, vol. xxiii. p. 551, "The original specimen described by Prof. Owen is headless," whereas the newly-discovered Berlin specimen has the head entire, and fairly well preserved, and still attached by the neck to the trunk.—ED.]

## On the Velocity of Light

IN view of the experiments of Young and Forbes on the velocity of light, and of the article published by Lord Rayleigh on the subject, it may not be out of place to state as a fact which seemed at the time too evident to require special mention in my paper "On the Velocity of Light," that if the velocity of red and of blue light in air differed by as much as one-tenth of 1 per cent., the image of the slit which served as the source of light, instead of being white, would be spread out into a spectrum which could not fail to be observed. The total displacement in these experiments amounted to 133 millimetres; therefore, a difference of velocity of the red and the blue rays of 1·8 per cent. would necessitate a spectrum 2·4 millimetres in length.

It is needless to say that no spectrum was observed. These facts appear to be utterly irreconcilable with the conclusion drawn by Messrs. Young and Forbes.

ALBERT A. MICHELSON

Schluchsee, Prussia, August 28

### Salmon in Preserved Rivers

HAVING resided for some time lately near one of our salmon rivers which is at present preserved by a club, I have at different times had conversations with men who knew it before its so-called preservation. They all say that when they were allowed to fish when and how they pleased, the supply of fish was much better in regard both to size and quantity. They account for it in the following manner:—Firstly, when the river was free, the people living near used to make spawning-beds for the fish, by placing large stones across the river and throwing gravel where deficient, and where gravel was naturally they used to loosen it with forks and remove the large stones. Secondly, they used to watch the fish at spawning time, and catch and kill all very large fish, say about 16 to 30 lbs. weight, after they had partially or wholly finished spawning, as they say the large fish destroy the salmon fry. Neither this nor the formation of spawning-beds is done at present. Would the above reasons account for the diminution in the size and number of salmon caught in our rivers? The diminution, in the river I speak of, cannot be accounted for by pollution, as the number of houses near enough to send their drainage into the river is too small to affect it, and as the river has a very quick fall and rocky bed, it is subject to such very rapid rises and falls in quantity of water that would prevent any settlement of noxious sediment. F. C. S.

### New Seismometer

IN NATURE, vol. xxiv. p. 113, there is a notice of a new seismometer which has several advantages claimed for it. Might I suggest what seems an obvious and important improvement? As a rule pendulums cannot record vertical or oblique motions, and yet these are often the most necessary and valuable to record. 1. To do this, and yet as easily allow of lateral registration, I would say, support a heavy (leaden) ball of some 100 lbs. by a 30 or 40 feet spiral or rubber spring of suitable strength. It will be found that a very considerable amount of vertical play can take place, especially vertical effort, ere the ball can be affected, and that lateral play of the support will produce very little effect indeed, unless, as is most unlikely, the motion is prolonged and is *continuous* in one direction. 2. Around the sphere, and at a very short distance from its surface, radial rods actuated like the key-plugs of a cornet are supported, say at every 30° all over the surface, contact with any one of which will electrically record *time*, and the pencil attached to the plunger record distance of stroke on revolving paper attached to plunger-tube.

Asam, July 6 S. E. PEAL

## THE BRITISH ASSOCIATION

THE actual number of persons who attended the York Meeting of the British Association, as announced at the last meeting of the General Committee, was 2556; divided between 272 old life-members, 27 new life-members, 312 old annual members, 175 new annual members, 1232 associates, 514 ladies, and 24 foreigners. The seven previous occasions on which this number has been exceeded were:—Newcastle-on-Tyne, 1863 (3335); Manchester, 1861 (3138); Liverpool, 1870 (2878); Bath, 1864 (2802); Glasgow, 1876 (2774); Dublin, 1878 (2578); Aberdeen, 1859 (2564). The number fell below 1000 at Cambridge, Plymouth, Southampton, Ipswich, Hull, and Swansea. 1280*l.* were paid out by the Council for scientific purposes after the last meeting, a larger sum than on any occasion since 1873; while between 1873 and 1861 that sum was always exceeded, and at Norwich, in 1868, it amounted to 1940*l.*

The following foreigners were present at the meeting:—Professrs Barker of Pennsylvania; Bergeron, Paris; Bojanowski; Carbonnelle, Brussels; Chemin, Paris; Craig, Johns Hopkins University, U.S.; Dohrn, Naples; Eads, St. Louis, U.S.; Gariel, Paris; Dr. Asa Gray, Harvard University; Halphen, Paris; Dr. Edwin Hall, Baltimore, U.S.; Hubrecht, Leyden; Prof. W. W. Johnson, Annapolis, U.S.; Prof. O. C. Marsh, Yale College; Moser, Berlin; Prof. H. A. Rowland, Baltimore; Stephanos, Paris; Sturm, Münster, Westphalia; Prof. H. M. Whitney, Beloit College, Wisconsin, U.S.A.

We ought to have stated in our report of the doings of the Association in our last number, that Prof. Huxley's lecture on Palæontology, which we gave in the same number, was delivered on the evening of Friday the 9th.

Nearly 350 papers or reports were read before the several sections. Of these the Physical and Mathematical Section received 89; the Chemical Section 49; Geology 59; Biology 79; Geography 16; Economic Science and Statistics 26; and Mechanical Science 29. Of the papers in Section A 23 related to Electricity; 21 were Mathematical; Optics claimed 12; Meteorology 11; Astronomy and Physical Geography 12; Heat 5; and miscellaneous physical subjects 5. Of course prominent subjects of interest were electric lighting, electric measurements, and Faure's cells. Such subjects were thoroughly ventilated by discussions both in Section and Committee, and more intimately during the thousand and one opportunities for interchange of ideas which occurred in the afternoon and evening. Again, the storage of energy, the nature of meteoric dust, the existence of intra-Mercurial planets, the lunar disturbance of gravity, the nature of colours, and the contact theory were each severally discussed. Among the 49 Chemical papers several theoretical matters were introduced—specially the atomic theory, chemical nomenclature, vapour densities, molecular weights, Mendeleeff's law, and molecular attraction; processes of analysis and technical operations were described, and new experiments were explained. Of course a good deal of the geological work bore reference to Yorkshire, especially to the evidences of glacial action which it presents. The geological papers were of a very general and interesting character, and embraced every branch of the subject, from the vulcanology of Japan to the minerals found at Laurium, and from the Cheshire salt beds to the evolution of the Plesiosaurus. Section D furnished a larger number of papers than any other Section except A, but we must bear in mind that it really consists of three sub-sections, devoted respectively to Zoology and Botany, Anatomy and Physiology, and to Anthropology. The latter subject has developed extraordinarily, more than half the papers contributed to the Section were read before this Sub-Section. The report of the Anthropometric Committee, which evoked a good deal of discussion, was read in the Section of Economic Science and Statistics. In this section Mr. Grant Duff delivered a very able address, which was warmly received. A tendency to introduce matter which has a political bearing and which may be discussed from a political standpoint is sometimes apparent in this section, and should be carefully guarded against by the Committee. The Mechanical Section furnished some important reports on patent laws, wind pressure, tides in the English Channel, and the steering of screw steamers. Here also were papers on the different forms of electric lamp, the electrical transmission of force, and the illumination of lighthouses.

Thus it will be seen that all the prominent subjects of science have received their share of attention, and at the hands of one or other of the sections have been either expanded or discussed. The interchange of ideas has been incessantly going on, and many men have become acquainted who might otherwise have remained unknown to each other for years. Some 500 scientific men have been gathered together from various parts of the British Islands; and some 2000 persons have been brought face to face with the burning scientific questions of the day, and have had new interests awakened, or old knowledge resuscitated. There can be little doubt as to the